2 Objective and Scope of Work

The effectiveness of soil washing depends largely on three conditions: the distribution and concentration of contaminant, the type of soil, and the type of extracting agent. The role that each of these conditions plays in the effectiveness of soil washing must be evaluated before attempting a full-scale cleanup of the site. As a result, potential treatments must be fully evaluated at bench or pilot scale using a system similar to the type of system that will be used in the field.

The main objective of this research was to design and develop a pilot-scale continuous-flow countercurrent soil washing unit that could effectively be used to evaluate the ability of a similar, but full-scale system to remove trace metals from contaminated soils at Federal facilities. However, this particular study focuses only on the investigation of operating parameters for such a pilot-scale system.

A pilot-scale continuous-flow countercurrent metal extraction system has been constructed and will be fully evaluated as a potential model of a full-scale soil washing system. Efficient and effective operation of the countercurrent metal extraction system requires optimization of several operating parameters. Several batch studies were carried out to determine these operating parameters.

The scope of work of this research is outlined below:

a. Construct the pilot-scale continuous-flow countercurrent metal extraction system.

b. Perform a solid-to-liquid ratio batch test to determine the optimal ratio between contaminated soil and extracting agent for the removal of metal contaminants.

c. Perform an extractant-effectiveness batch test to determine the most effective extracting agents for metals in contaminated soils.

d. Perform a steady-state batch test to determine the reaction time for soil and extracting agent to reach chemical steady state.